



February 1, 2018

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Re: Marine Mammal Monitoring Report for WETA Downtown San Francisco Ferry Terminal Expansion Project, San Francisco, California (NMFS reference no. SWR-2013-9595) - 2017

Dear Ms. Small:

This letter presents the results of marine mammal observing/monitoring performed by WRA, Inc. (WRA) at the Water Emergency Transportation Authority (WETA) Downtown San Francisco Ferry Terminal Expansion Project site (Project Area) in San Francisco, San Francisco County, California. This observation effort was required during pile driving activities (including pile removal) as per the project's Incidental Harassment Authorization (IHA) issued by the National Marine Fisheries Service (NMFS) on May 30, 2017 (NMFS reference no. SWR-2013-9595). The purpose of the observation effort was to both document and prevent/minimize "take" of harbor seals (*Phoca vitulina*), California sea lions (*Zalophus californianus*; hereafter sea lion), and other species.

The IHA specifies the quantity of allowable Level B "take" events (harassments; i.e., events that cause or may cause behavioral alterations/disruptions, but do not have the potential for injury or mortality) for each focal species, and recording such events (as observed) was a primary duty of the marine mammal observers (MMOs).

Summary of Contents

Pile driving activities were performed in accordance with the IHA, with no indication that any marine mammals were harmed or injured as a result of these activities in 2017. No marine mammals were observed within the mandatory shutdown zone for active pile driving and other in-water work, and no work shutdowns were initiated. The total amount of recorded Level B harassments was substantially lower than the allowable amount as stipulated in the IHA for most of the observed species.

Project Area Description

The waterside portion of the Project Area consists of an approximately 8-acre area featuring concrete/urban shoreline and adjacent waters of San Francisco Bay along The Embarcadero and San Francisco Bay Trail, between the Ferry Building and Pier 14 within the City of San Francisco. The Project Area is bounded by the Embarcadero and associated infrastructure/development to

the south-west, the existing Ferry Building to the north, open waters of San Francisco Bay to the east, and Pier 14 to the south.

Methods

Pile driving/removal and associated marine mammal observation occurred on 110 days between June 1 and November 16, 2017 (Monitoring Period) and involved approximately 900 hours of observation. Only vibratory pile driving and pile extraction occurred; impact hammer driving was not utilized. Pile elements varied and included 14-inch H-pile template installation and extraction, and the installation of 24-inch, 30-inch, and 36-inch steel piles. As stipulated in the IHA, two WRA MMOs were present simultaneously during observing periods; MMOs met the qualifications specified in section 4.1 of the 2017 Marine Mammal Monitoring Plan (MMMP).¹ MMOs received training in marine mammal observation methodology, the identification of species mammals expected to be present in the vicinity, and the project's protective measures relevant to these species. The vast majority of observations were conducted by Jude Stalker and Stacie (Ka'ena) Meyer, with additional MMOs covering small numbers of observation periods as needed.

In accordance with the IHA and the MMMP, monitoring during each pile driving period started at least 30 minutes prior to pile driving (or removal) initiation and ended at least 30 minutes after such work was completed for the day. Observers were stationed at pier and landside positions that afforded the best view of both the in-water work area and adjacent Bay waters. Typically, one or both observers were positioned at the northern terminus of Pier 14 (directly adjacent to and east of the Project Area), which provided the best view of open Bay waters and often a favorable view of the active pile driving/removal location as well. At times, one observer was positioned at one of several locations within the waterfront portion of the Project Area to obtain an unobstructed view of the active pile driving/removal location. Observations were made with a spotting scope (60 x zoom magnification), binoculars (8 x 42 magnification), and the naked eye. When feasible, a range finder was used to measure the distances of mammals from the Project Area. Conditions during observation periods were variable but generally favorable to marine mammal observations, with no fog present and average wind speeds ranging from 1-10 miles per hour. There were a few occurrences of rain and wind gusts up to 25 miles per hour with associated choppy water conditions. Additionally, hazy air conditions resulting from regional wildfire events were present during portions of October 2017.

MMOs recorded all observations of marine mammals (see note regarding observable areas below). Information recorded for each observation included species, number of animals, approximate distance from the active in-water work area, behavior, direction of travel (if relevant), and any perceived reaction by the animals to work activities, as well as the specific stimulus that appeared to cause the reaction. Examples of such reactions were "alerts" (i.e. a clear indication that the animal was visually investigating a project-related acoustic disturbance) and "avoidance" (i.e., a change in swimming direction from the area apparently due to work activities). The two observers communicated frequently during observation periods (verbally, via marine radios and/or mobile devices) to refine data collection, including the number of marine mammals within focal survey areas and the distances of these animals from project-related stimuli.

Note: A beach on the south side of Yerba Buena Island (located approximately 1.8 miles northwest of the Project Area) is used throughout the year as a haul-out by harbor seals, and this area is within the line-of-site of the Project Area and Pier 14. However, MMOs consistently found

¹ "Marine Mammal Monitoring Plan, [WETA] Downtown San Francisco Ferry Terminal Expansion Project." AECOM. May 2017. 16 pp.

that, even under the most suitable conditions (very limited to no wind, cooler temperatures with minimal ‘heat waves’), a useful estimate of the number of seals on the beach, or especially confirmation that a given seal had entered the water from the haul-out, was not feasible. Waters adjacent to the beach haul-out are within the Level B ZOI for driving/removal of the steel piles (all sizes) using vibratory methods. As such, it is presumed that some quantity of potential harbor seal Level B takes for animals in the water near the haul-out occurred during pile driving/removal events. No additional details regarding the Yerba Buena Island haul-out are provided herein.

Recording Take Events

“Take” events as covered by the IHA were logged by the observers based on two parameters: 1) “perceived harassment” as described above, i.e., observable behavior alterations in response to project-related stimuli, and 2) “modeled harassment” based on the proximity of observed animals to active pile driving in the context of defined zones within which potential harassment was assumed. The relevant Zones of Influence (ZOIs) for the latter parameter were provided by the MMMP, and dependent on marine mammal species and the size of pile being driven. The ZOIs used are shown in Table 1.

Table 1. Modeled ZOIs – Vibratory Hammer Driving

Pile diameter (in.)	Level A (harm) distance			Level B (harassment) distance
	Harbor seal	Cal sea lion	Harbor porpoise	All species
36	117 ft. (36 m)	8 ft. (2.5 m)	284 ft. (87 m)	28.8 miles (46.4 km)
30*	117 ft. (36 m)	8 ft. (2.5 m)	284 ft. (87 m)	28.8 miles (46.4 km)
24	117 ft. (36 m)	8 ft. (2.5 m)	284 ft. (87 m)	28.8 miles (46.4 km)
14 H-pile*	< 3.3 ft. (< 1 m)	< 3.3 ft. (< 1 m)	< 3.3 ft. (< 1 m)	0.6 mile (1.0 km)
18 wood pile	5 ft. (1.5 m)	< 1.0 ft. (0 m)	12 ft. (3.6 m)	1.0 mile (1.6 km)

*Modeled ZOIs for these piles were not included in the MMMP; for 30” steel piles, the provided ZOIs for 36” and 24” piles were used as a proxy; for H-piles, ZOIs provided for the WETA Central Bay Operations and Maintenance Facility Project (NMFS ref. no. 2011/05520) were used.

Throughout the Monitoring Period, MMOs took an inclusive approach to recording take events; if there was any uncertainty regarding whether or not an individual mammal was within a ZOI (i.e., was potentially “harassed”), the individual was treated as being within the ZOI. Additionally, take events were measured at the level of individual animal per work day. In other words, if a harbor seal was logged as harassed, in theory that individual seal could be harassed multiple times on the same day and these would not be logged as separate events. In practice, while observers made efforts to identify and track the presence and movement of individual animals (generally harbor seals, based on unique color patterns on the pelage), a conservative approach was taken wherein harassment events on the same day were assumed to involve separate animals, unless the observers were fully confident that a repeat animal or animals were involved.

It should be noted that Bay waters directly south and southeast of Pier 14 were mapped as outside of the various ZOIs as shown in the MMMP, presumably due to the solid base/footing of the pier.

As such, marine mammals observed exclusively in that area during a given bout of pile driving were not recorded as Level B harassments.

As specified in the IHA, a default minimum exclusion zone for all marine mammals during pile driving and other in-water activities was 10 meters (approximately 33 feet) at all times. Temporary shutdowns to pile driving or other activities were requested by the observers when an animal or animals were observed within or approaching this distance; driving remained halted until the subject animal(s) were observed to move outside of this zone, or no animals were observed within the zone for a minimum of 15 minutes after the shutdown was initiated.

Results and Discussion

Harbor seals were the primary marine mammal species observed during the Monitoring Period, with individuals recorded on nearly every day of observation. The vast majority of these seals were observed within 1,000 feet of the Project Area. Sea lions were also regularly observed, again with most individuals observed in inshore waters near or along the San Francisco waterfront.

Harbor porpoises were observed on three days during the Monitoring Period, i.e. August 9, October 3, and October 19, 2017. All porpoise observed were in open Bay waters between approximately 2,000 and 20,000 feet (approximately 0.4 to 3.8 miles) from the Project Area. MMOs noted very small cetaceans with short, relatively inconspicuous dorsal fins, and non-demonstrative behavior when the animals were visible at the water's surface. Harbor porpoises were observed in groups of two to three individuals on all occasions when they were observed. No other cetacean species were observed during the Monitoring Period.

Take Events

A summary of Level A and B events recorded by the observers during the Monitoring Period is provided in the table below. There were no Level A harassments/takes or any other indicators of marine mammal injuries observed during the Monitoring Period. A total of 50 Level B harassments for harbor seal were recorded, less than 1% of the allowed amount; all of these harassments were modelled save for one exception described below. The greatest number of harbor seal Level B harassments occurred on November 9, when seven were recorded. On average, there was less than one harbor seal harassment each day of work involving use of a vibratory hammer. MMOs also recorded 31 Level B harassments for sea lions during the Monitoring Period, again totaling less than 1% of the allowed amount. The highest daily counts occurred on November 9 and October 12 with three harassments on each day. As with harbor seal, all of the recorded sea lion harassments were modeled with one exception.

A total of eight harbor porpoise Level B harassments were recorded during the Monitoring Period, with another three occurrences that were not considered potential harassment as detailed below. On August 9, a group of three harbor porpoises were observed at 12:45 PM during vibratory work and another three were observed at 3:30 PM; vibratory work was occurring during both observations and the MMOs assumed that these observations involved six individual porpoises. On October 3, three harbor porpoises were observed while no vibratory work was occurring and no potential harassment was assigned to this observation. On October 19, two harbor porpoises were observed approximately 3,000 feet from the work area 15 minutes after vibratory work had ceased. The MMOs took an inclusive approach in this case and presumed that the porpoises had likely been in the area when vibratory hammer use was occurring, recording the observation as a Level B harassment. No other harbor porpoises were observed after October 19.

Table 2. Summary of Recorded Level B Take Events

Species	Level A		Level B		
	Allowed	Recorded	Allowed	Perceived	Modelled
Harbor seal	0	0	6,414	1	49
California sea lion	0	0	6,950	1	30
Harbor porpoise	0	0	9	0	8

The two instances in which perceived Level B harassment were recorded were as follows:

- On June 22, a harbor seal was seen swimming north approximately 300 feet from a dredge barge located within the Project Area; upon initiation of work on the barge, the seal changed direction and began swimming south. Although the vibratory hammer was not in use at this time, the observation was recorded as a perceived Level B harassment.
- On November 2, a sea lion was seen approaching the active pile driving barge. When approximately 500 feet away, it appeared to have a direct response to the work on the barge and changed direction. This observation was recorded as a perceived Level B harassment.

No other clear reactions to work activities (including vibratory pile driving) were observed during the monitoring, including by the seals seen nearest the work equipment. The average distances of seals and sea lions from the Project Area did not appear to have any direct association with work activities, and animals appeared habituated to general human presence and elevated noise levels in the vicinity.

Pile Driving Shutdowns

No marine mammals were observed within the mandatory shutdown zone for active pile driving and other in-water work (33 feet [10 meters]) when such work was occurring. As such, work was not halted for purposes of take avoidance during pile driving activities.

On August 3, one young adult male California sea lion was seen swimming toward the supply barges in the Project Area. Active pile driving was not occurring at the time and thus a shutdown was not requested, but the crew was still notified by the MMOs to be aware of the mammal near the work area. The sea lion was observed to be approximately 75 feet from the work area at its closest point, but later observations indicated that it had left the area.

Please contact me with any questions or if you are seeking additional information.

Sincerely,

A handwritten signature in black ink that reads "Jason Yakich". The signature is written in a cursive style with a large, prominent "Y" and "K".

Jason Yakich
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